

**REMARKS**

Claims 1-33 are pending in this application. Claims 1-33 are rejected and Claims 13 and 23 are additionally objected to. Claims 1, 13, 14, 23 and 24 have been amended and Claims 34 and 35 newly added. It is believed that pending claims 1-35 are each in allowable form.

5      **I. Objection to the Specification**

In the Office Action, particularly in paragraph 2, the abstract was objected to due to a formal error. The abstract has been amended and the error corrected. Therefore, the objection to the specification should be withdrawn.

10     **II. Claim Objections**

In the Office Action, specifically in paragraph 3, claims 13 and 23 were objected to because the acronym DOE was not defined. Claims 13 and 23 have been amended to define the acronym DOE and therefore the objection to claims 13 and 23 should be withdrawn.

15     **III. Claim Rejections under 35 U.S.C. § 112**

In the Office Action, specifically in paragraph 5, claim 24 was rejected due to a formal, antecedent basis issue. Claim 24 has been amended and the limitation "semiconductor manufacturing process" now has sufficient antecedent basis and therefore the rejection of claim 24 under 35 U.S.C. § 112, second paragraph, should be withdrawn.

20     **IV. Claim Rejection Under 35 U.S.C. § 102**

In the Office Action, specifically in paragraph 7, claims 1-3, 7-8, 10-11, 24-25, 28-29 and 31-32 were rejected under 35 U.S.C. § 102(e) as being unpatentable by Tanaka,

*et al* (U.S. Patent Number 6,616,759), hereinafter “Tanaka.” Applicants respectfully submit that these claim rejections are overcome for reasons set forth below.

Claims 1 and 24 represent the independent claims of the rejected claim set listed above. Claims 2-3, 7-8 and 10-11 depend from claim 1 and claims 25, 28-29 and 31-32 5 depend from independent claim 24.

Claim 1 has been amended. Amended independent claim 1 recites the features of:

10 determining principal components from the set of input data by Principal Component Analysis (PCA) and determining a set of principal component score data by multiplying the set of input data by parameters describing a relationship between the principal components and the input data.

Independent claim 24 has also been amended. Independent claim 24 recites the feature of:

15 at least one processor . . . adapted to determine principal components from the sets of input data by Principal Component Analysis (PCA) and to determine a set of principal component score data by multiplying the set of input data by parameters describing a relationship between the principal components and the input data.”

The cited reference of Tanaka does not disclose or suggest determining the 20 principal component score data, much less determining the principal component score data by multiplying the set of input data by parameters describing a relationship between the principal components and the input data. Applicants respectfully submit that Tanaka does not teach a parameter that describes a relationship between the principal components and the input data. Tanaka, rather, multiplies the sensed data by 25 a function to obtain what Tanaka labels an explanatory variable, X. The explanatory

variable is used in a prediction equation to predict measured values Y which are representative of measured values.

Tanaka therefore uses a different approach and does not teach or suggest the claimed features highlighted above. Therefore, independent claims 1 and 24 are 5 distinguished from the reference of Tanaka, and the rejection of claims 1 and 24 under 35 U.S.C. § 102(e), should be withdrawn. Since claims 2, 3, 7-8, 10-11 depend from independent claim 1, they are similarly distinguished from Tanaka as are claims 25, 28-29 and 31-32 which depend from independent claim 24. Therefore, the rejection of claims 1-3, 7-8, 10-11, 24-25, 28-29 and 31-32 under 35 U.S.C. § 102(e) as being 10 unpatentable by Tanaka, should be withdrawn.

**V. Claim Rejections Under 35 U.S.C. § 103**

In the Office Action, specifically paragraphs 9-14, claims 4-6, 9, 12-23, 26, 27, 30 and 33 were rejected under 35 U.S.C. § 103(a). In paragraph 9, claims 4-6 and 26-27 were rejected as being unpatentable over Tanaka, further in view of Campbell, *et al* 15 (U.S. PGPUB 2002/0085212), hereinafter “Campbell.” In paragraph 10, claims 9 and 30 were rejected as being unpatentable over Tanaka, further in view of Ruddy, *et al* (U.S. Patent Number 5,064,605), hereinafter “Ruddy.” In paragraph 11, claims 12-14, 17-18, 20-22 and 33 were rejected as being unpatentable over Tanaka, further in view 20 of Schwarm (U.S. PGPUB 2004/0148049). In paragraph 12, claims 15-16 were rejected as being unpatentable over Tanaka, further in view of Schwarm and Campbell. In paragraph 13, claim 19 was rejected as being unpatentable over Tanaka in view of Schwarm and Ruddy. In paragraph 14, claim 23 was rejected as being unpatentable

over Tanaka, further in view of Campbell, Schwarm and Ruddy. Applicants respectfully submit that all of these claim rejections are overcome for reasons set forth below.

In summary, claims 4-6, 9, 12-23, 26, 27, 30 and 33 were rejected in various paragraphs and applying various references, under 35 U.S.C. § 103(a). Claims 13 and 5 23 represent the independent claims rejected under this section. Each of independent claims 13 and 23 recite the feature of:

determining a set of principal component score data by multiplying the set of input data by parameters describing a relationship between the principal components and the input data.

10 Independent claims 13 and 23 are therefore distinguished from the primary reference of Tanaka for reasons set forth above with respect to independent claims 1 and 24 which are distinguished from the primary reference of Tanaka.

The cited reference of Campbell has apparently been relied upon for teaching a multi-zone vertical furnace which performs deposition, whereby each zone has a 15 different temperature which is known and layer thickness is measured. Ruddy has apparently been relied upon for teaching the use of the Arrhenius model in monitored equipment. The cited reference of Schwarm has apparently been relied upon for teaching applying DOE to generate sets of input and output data in a wafer processing system. Neither of the references of Campbell, Ruddy, or Schwarm make up for the 20 above-stated deficiencies of Tanaka with regards to the features highlighted above, and neither of Campbell, Schwarm or Ruddy teaches or suggests the claimed features of independent claims 1, 13, 23 and 24 as above. As such independent claims 1, 13, 23 and 24 are each distinguished from the cited references, taken alone or in combination.

Therefore, the rejection of independent claims 13 and 23 under 35 U.S.C. § 103(a), should be withdrawn. Claims 4-6, 9 and 12 depend from independent claim 1; claims 14-22 depend from independent claim 13; and claims 26, 27, 30 and 33 depend from independent claim 24. Since each of these dependent claims incorporate the 5 distinguishing features of their base claims, the rejection of claims 4-6, 9, 12-23, 26, 27, 30 and 33 under 35 U.S.C. § 103(a) as being unpatentable over Tanaka in view of the variously-applied secondary references, should be withdrawn.

Applicants also point out that claim 14 has been amended and now recites the feature of "filtering noise within the sets of input and output data". Applicants believe 10 that the feature of filtering is not disclosed in the references of record and that amended claim 14 is therefore further distinguished from the references of record.

#### VI. Newly-Added Claims

Independent claims 34 and 35 are newly-added and point out distinguishing 15 features of applicants' invention. Newly-added claim 34 includes the features of "filtering noise within the sets of input and output data to determine a filtered relationship; and feeding back the filtered relationship to the semiconductor process to predict sets of new input and output data", and newly-added claim 35 recites the feature of "at least one processor coupled to the storing means, adapted to . . . filter noise 20 within the sets of input and output data and determine a filtered relationship; and to feed back the filtered relationship to the semiconductor process to predict sets of new input and output data." Applicants believe that newly-added claims 34 and 35 are distinguished from the references of record and in allowable form.

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**CONCLUSION**

Based on the foregoing, each of pending claims 1-35 is in allowable form and the application is therefore in condition for allowance, which action is respectfully and expeditiously requested.

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Respectfully submitted,

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